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Gender Differences in Load Carriage Injuries of Australian Army Soldiers

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Background

- Soldiers are required to carry loads of 50+kg while performing combat tasks, often in unpredictable and hostile environments.





Background

- Removal of gender restrictions in combat arms trades of military forces, combined with the changing nature of warfare, means female soldiers are more frequently exposed to heavy military load carriage.





Background

- Currently female soldiers carry lighter absolute loads than male soldiers but only slightly heavier relative loads

ABSOLUTE LOADS*

FEMALE: $M = 26.4$ kg

MALE: $M = 39.0$ kg

$p = .045$

RELATIVE LOADS

FEMALE: $M = 43\%$

MALE: $M = 47\%$

$p = .55$





Purpose

- To determine relative risks and patterns of injuries, including serious personal injuries (SPI), associated with contemporary military load carriage in female compared to male soldiers.





Methods

- OHSCAR data base search
- Over a two year period (2009 – 2010)
- Descriptive analysis was performed and relative injury risks were calculated, by gender.
- Ethics approval for the research was granted by the Australian Defence Human Research Ethics Committee, and the Behavioural and Social Sciences Research Ethics Committee of The University of Queensland.





Results

- Mean ARA population over 2 years = 24,876 personnel
 - Female $n= 2441$ (10%): Male $n= 22435$ (90%)
- 1, 954 OHSCAR Reported Injuries
 - 401 (21%) reported injuries associated with load carriage
 - Female $n=40$ (10%): male $n= 361$ (90%)
 - RR = 1.02 (95% CI 0.74 to 1.41) Female compared to Male.



Results

- SPI
 - Female $n=6$ (15%): male $n= 23$ (6%)
 - RR of SPI = 2.40 (95% CI 0.98 to 5.88)





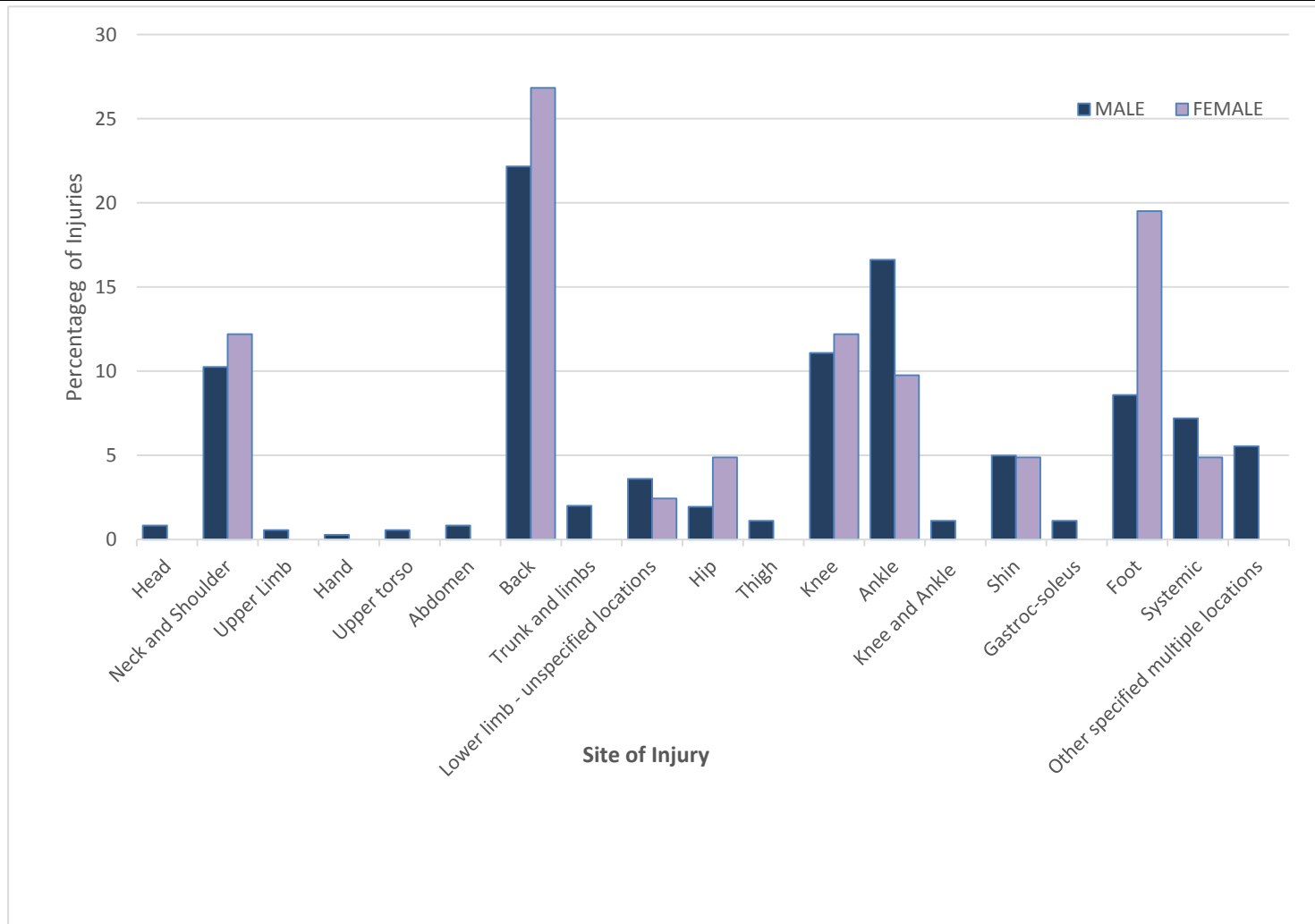
Results

- The most common site of injury for both genders was the back (F: n=11, 27%; M: n=80, 22%).
- Females:
 - the foot (n=8, 20%),
 - 'neck and shoulder' and knee (n=5, 12%) and
 - ankle (n=4, 10%).
- Males:
 - the ankle (n=60, 17%),
 - knee (n=40, 11%),
 - 'neck and shoulder' (n=37, 10%) and
 - foot (n=31, 9%).





Results





Results

- SPI
 - For both female and male soldiers, the lower back was the leading site for SPI (F: n=3, 43%: M: n=8, 29%).
 - Systemic illness, through heat stress, was also a leading 'site' of injury in male soldiers (n=8, 29%) but not in females (n=1, 14%).





Discussion

- The back was the leading site of injury and SPI in male and female soldiers.
- The lighter structure of females may have predisposed them to their observed higher risk of suffering SPI while carrying loads.
- Female soldiers reported a high proportion of foot injuries while male soldiers experienced a high proportion of ankle injuries.
- This finding warrants investigation of:
 - the relationships between military boot types, gender and load carriage injuries
 - the relationships between load carriage contexts and injuries



Conclusion

- Based on load carriage loads and tasks over the study period female soldiers were at no great risk of suffering a load carriage injury than male soldiers
- However, there was the potential for female soldier musculoskeletal injuries to be more serious
- Risk of injury and risk of SPI may increase substantially if females are required to carry absolute loads akin to male soldiers – meaning relative loads higher than male soldiers.



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